

 **SOLDIERS** Are Our Credentials! 
 


ARMAMENTS FOR THE ARMY OF THE FUTURE

Symposium and Exhibition

24 June 1998

Alan Winkenhofer
Chief, Science Technology & Programs Division
Directorate of Force Developments, USAARMC
Fort Knox, KY


 **America's ARMY** 


622

SOLDIERS Are Our Credentials!

Army After Next

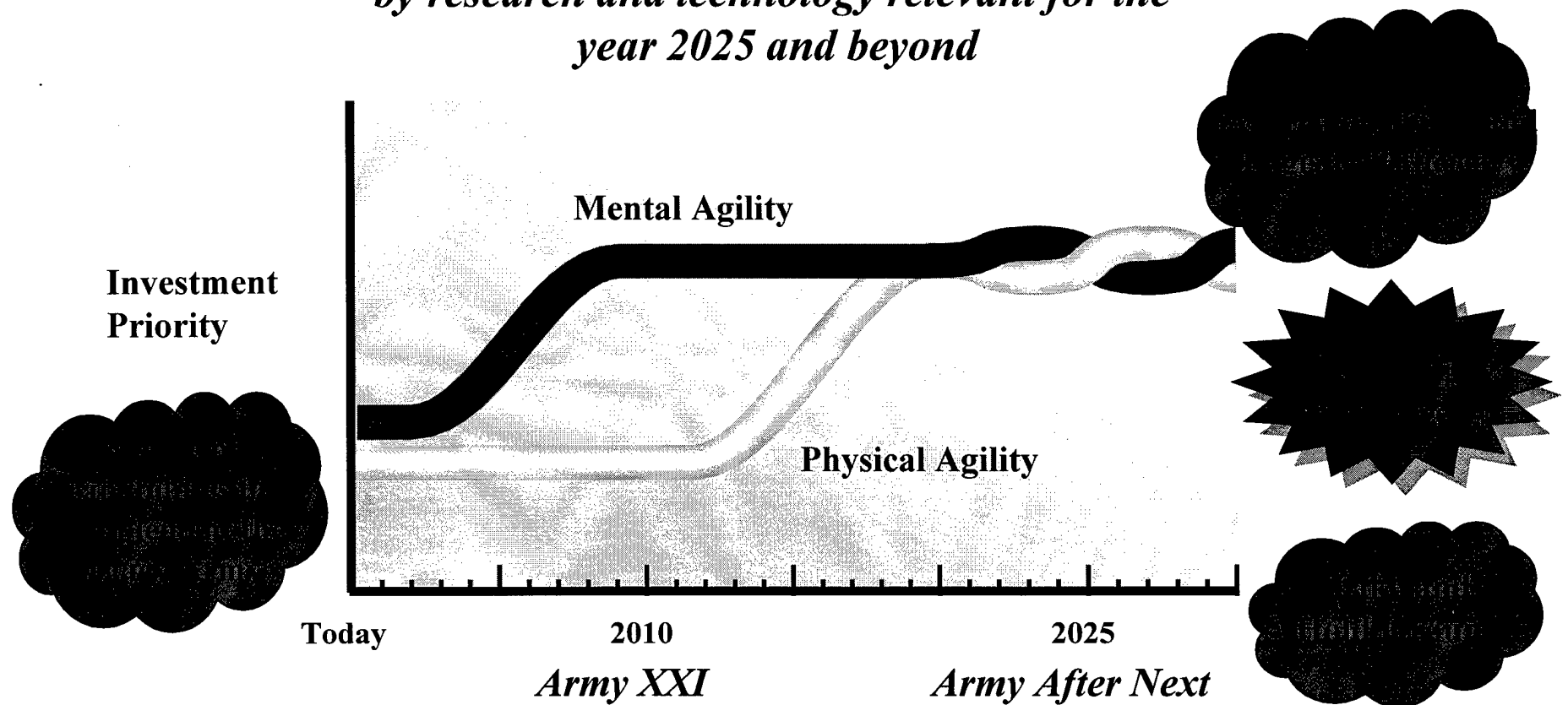
Emerging Operational Concept

- Precision lethality, precision maneuver
- Information based warfare
- Rapid strategic & operational deployability
- Fast operational & tactical mobility
- Dramatically reduced logistics tail
- Survivability thru situational awareness, mobility, countermeasures & stealth vice heavy armor protection
- Advanced human factors integration
- Ability to leverage new technology

America's ARMY



AAN is the process for the development of future warfighting concepts supported by research and technology relevant for the year 2025 and beyond



SOLDIERS Are Our Credentials!



General

ARMY AFTER NEXT FCS CHARACTERISTICS

- A multi-role, multi-functional ground system that enables revolutionary force effects
- Growth potential integrated into each sub-system and component
- Optimized for lethality, with unprecedented mobility and survivability capability
- Long range information/C2 connectivity to other battlefield functions/delivery systems
- Air Transportable - enhanced strategic, operational, and tactical mobility
- Efficient power sources for all functions (lethality, survivability, mobility)
- Precision weapons, point or area, multipurpose munitions
- Remote capability for mine warfare
- Ultra low signature
- Embedded training, planning, rehearsal capabilities

America's ARMY

625

SOLDIERS Are Our Credentials!



Lethality

Desired Capabilities

- Both NLOS and LOS capable
 - ◆ Precision non-line of sight preferred engagement
 - ◆ Line of sight for close combat (point& area targets)
- Defeat any threat armored vehicle equipped with advanced ERA & APS
- Multi-purpose munitions (aerial, personnel, bunkers, buildings, etc)
- Long-range target detection & identification
- Near simultaneous engagement of multiple type targets
- All weather capable systems
- Automatically plan, optimize, and execute selected lethality options

America's ARMY

SOLDIERS Are Our Credentials!

Desired Capabilities

Survivability

- Light-weight armor
- Ultra low signature in all spectra
- Active protection system
 - ◆ Defeat incoming threat direct and indirect CE & KE munition without reliance on heavy armor
 - ◆ Any munitions residual effects limited to medium caliber cannon
- Ballistic protection for crew (2 or 3) that defeats up to medium caliber cannon, air burst, artillery and mines
- Standoff detection of surfaced laid and buried mines; remotely disable/defeat mines

America's ARMY

SOLDIERS Are Our Credentials!

Desired Capabilities

Strategic/Operational Deployability Operational/Tactical Mobility

- Deployable by C130-like airframe
- Conduct continuous operations without CL III resupply: 2 days/
800 - 1500 km
- 90 km/h cross country dash speed
- 75 km/h sustained cross country speed
- 120 km/h sustained road speed
- Automatic navigation and movement

America's ARMY



Desired Capabilities

Sustainment

- Up to 30 days or 1500 kms of operation before power resupply
- 7-10 days before ammunition resupply
- Redundancy, with automatic re-allocation of tasks if components malfunction
- Fault/failure free platform components - ultra durability
- Ease of maintenance; repairable by crew, automatic prognostics to anticipate failures before they occur and automatic diagnostics that pinpoint failures
- Embedded, automatic fuel, ammo, maintenance status reporting
- All mobility-restoration or maintenance tasks require no more than two personnel

SOLDIERS Are Our Credentials!

Desired Capabilities

MANPRINT

- 2-3 man crew
- Sensor, artificial intelligence, and other technologies optimized to reduce task loading on crew
 - ◆ Improve quality of decisions and accelerate human execution
- Ability to move people/equipment in all configurations
- System design and operation minimize repetitive training necessary to maintain a high proficiency standard
- User friendly controls
- Design enables extended continuous manning by crew
- Fully embedded training and rehearsal system

America's ARMY

SOLDIERS Are Our Credentials!

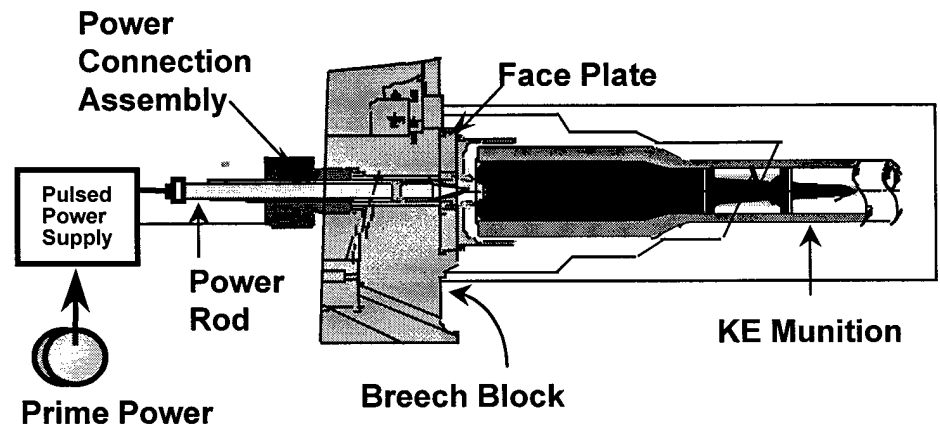
Electro-Thermal Chemical Gun

Potential Pay-Off

- 140mm performance with growth potential
- Can fire smart munitions + conventional rounds
- Improved accuracy
- Potential for marginal hypervelocity performance
- Potential for low vulnerability propellant

Development Issues

- Development of a high energy benign propellant



ETC Power Connection & Breech Configuration

Assessment

- No revolutionary lethality
- No reduced ammunition logistical burden
- Avoids the burden of a conventional 140mm upgrade
- Most suitable as a risk mitigator to sustain Abrams overmatch

America's ARMY

SOLDIERS Are Our Credentials!



Potential Pay-Off

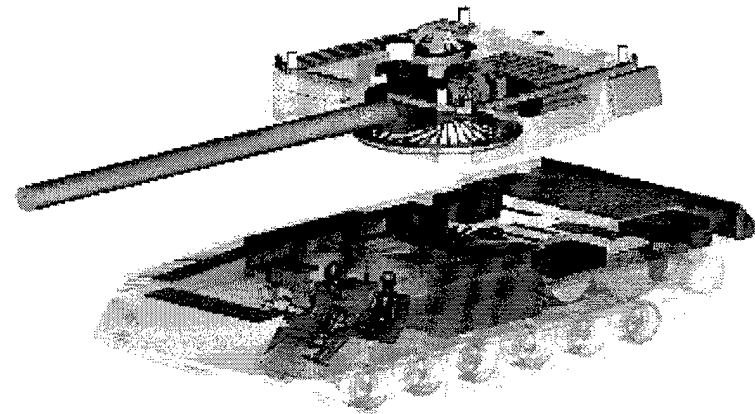
- Overmatch lethality through hypervelocity:
ERA & KE APS defeat
- Tunable muzzle energy - lethality at
ordnance velocity
- Low visual signature
- Pulsed power available for other
applications (DEW)
- Synergy of "all electric" vehicle
- Reduction in ammo logistics

Development Issues

- Pulse power volume/weight
- Utility of hypervelocity against advanced
armors
- Launcher and projectile challenges
- High density prime power source (not
included in this program)
- Impact on crew and system

Electro-Magnetic Gun

EM Tank Concept



Assessment

- Potential for revolutionary effects;
overmatch with elimination of ammo log
tail
- Significant developmental challenges to
weaponize
- Pulsed power storage efforts may be most
significant contribution

America's ARMY

SOLDIERS Are Our Credentials!



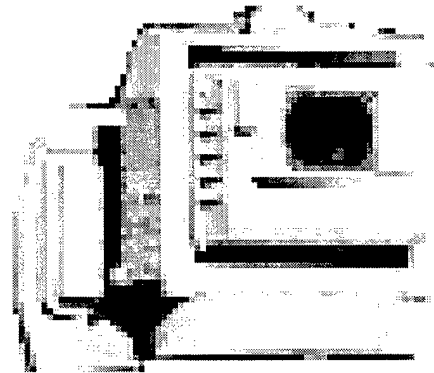
Potential Pay-Off

- Lethality alternatives from incapacitation to "Soft kill"
- Multi role / function uses
- Reduction in logistics burden
- Facilitates all electric vehicle & associated potential advantages
- Significant opportunities for survivability enhancements

Development Issues

- Power storage - size & weight
- Effect at tactically desirable ranges; ability to localize effects
- Sensitivity to movement
- Antennas, power conditioners, beam propagation, etc
- Political sensitivity

Directed Energy Weapons



Stingray
(as an early example)

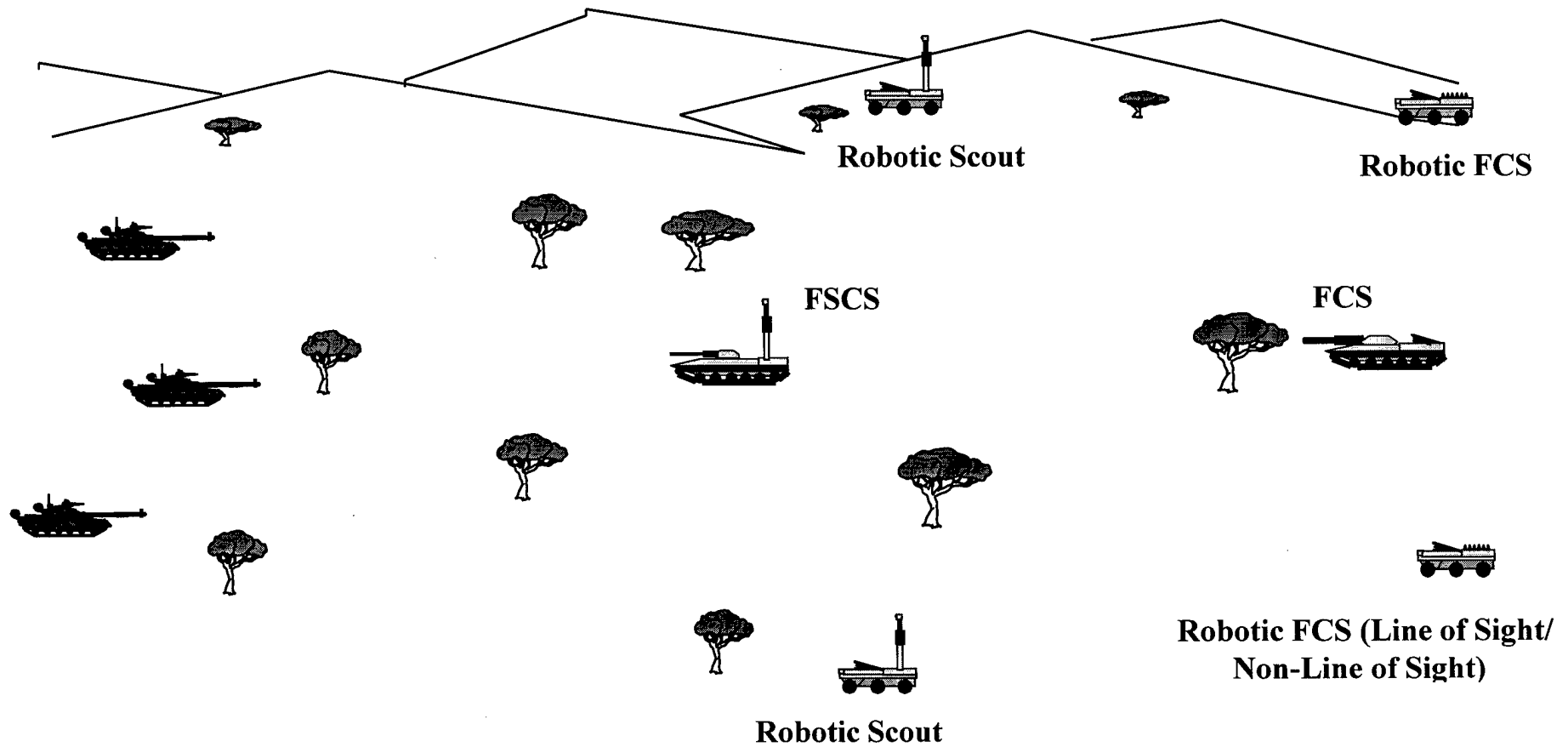
- Lasers
- High power microwave
- Particle beam

Assessment

- Revolutionary defeat mechanism
- Near to mid-term as a secondary weapon-medium risk
- Potential for primary weapon-high risk
- Considerable DOD \$; no \$ focused on ground platform program

America's ARMY

AAN Design Systems



SOLDIERS Are Our Credentials!



Future Combat Vehicle

Combat Developer Conclusions

- No evidence that by 2003-2005 a single technology will be sufficiently viable to provide “Leap Ahead” lethality for fielding before 2015-2020
- Evidence suggests that by 2003-2005 a combination of technologies will prove viable, that when synergistically packaged have the potential to provide “Leap Ahead” warfighting effects
- Key enabling technologies
 - ◆ Directed energy
 - ◆ Active protection (CE&KE)
with standoff defeat
 - ◆ All electric systems
 - Hybrid electric drive
 - Fuel Cells
 - Pulsed power storage
 - ◆ Signature management
 - ◆ High density engines
 - ◆ Lightweight materials for
structure/protection

America's ARMY